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EXAMINER	
BROOME, SAID A	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/751,328	XIE ET AL.	
	Examiner	Art Unit	
	SAID BROOME	2628	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *08 April 2008*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *2-4,14,15 and 17-24* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *2-4,14,15 and 17-24* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. This office action is in response to an amendment filed 4/8/2008.

2. Claims 2, 19 and 23 have been amended by the applicant.

3. Claims 3, 4, 14, 15, 17, 18, 20, 21, 22 and 24 are original.

4. Claims 1, 5-13, 16 and 25-36 have been cancelled.

Specification

The specification is objected to as failing to provide proper antecedent basis for the claimed subject matter recited in lines 1-2 of claim 23: "computer-readable medium" because the phrase "computer-readable medium" is known in the art to include both statutory media and non statutory media (. See 37 CFR 1.75(d)(1) and MPEP § 608.01(o).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 17-19, 23 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cornish et al. (hereinafter "Cornish", "*View-Dependent Particles for Interactive Non-Photorealistic Rendering*") in view of Blinn (US Patent 6,184,891) in further view of Koshiba et

al. (hereinafter "Koshiba", US Patent 6,040,840) and in further view of Kumar et al. (hereinafter "Kumar", "*The SunSaver: An OpenGL Visualization of the Sun's Surface*").

Regarding claim 17, Cornish fails to teach that each list of coverage layers is generated by processing the particles in order from farthest from a camera position to nearest. Blinn teaches that each list of coverage layers is generated by processing the particles in order from farthest from a camera position to nearest (col. 8 line 60 - col. 9 line 10: "*…objects like A that are partially occluded by other objects (e.g., B) are fogged using a fog layer having a fog amount f, the fog amount from the viewpoint all the way to A…the fogged objects A and B can be rendered to separate image layers and composited later to construct an output image…*", *where the collection of layers are generated by processing the particles, or fog, in order of visibility from a camera potion or viewpoint*, Fig. 6), therefore it would have been obvious to one of ordinary skill in the art at the time of invention to modify the composited particles of Cornish, contributing particle color and depth values of Blinn, as well as the particle radius of Koshiba, with the particle alpha blending of Kumar because this modification would provide accurate rendering of composited particles that are alpha blended to efficiently produce the contributing color of merged particles containing a radius, position and depth in 3D space by avoiding occluded portions related to particles at the determined depth in the 3D environment to produce accurate display of the particle in the composited image, thereby reducing the amount of computational resources used to display the contributing colors through avoiding display of the occluded regions.

Regarding claim 18, Cornish fails to teach adding a new coverage layer for a particle from a particle system that follows a cutout particle in the processing. Blinn teaches adding a

new coverage layer for a particle from a particle system that follows a cutout particle in the processing (col. 9 lines 11-21: "*…simulating fog on two objects A and B can be extended to an arbitrary number of layers of fogged objects. FIG. 6 extends the example in FIG. 5 by adding another object C (170) with a fog layer 172 of amount j in front of C…The new fog layer jF and object C can be overlaid on the combined layer P using the over operator…*", *where a new coverage layer jF is added on top of the existing layer P, which represents the particle system of fog, that contains the visibility and color contribution information of the particles that occlude objects A and B, shown in transition from* Fig. 5 to Fig. 6), therefore it would have been obvious to one of ordinary skill in the art at the time of invention to modify the composited particles of Cornish, contributing particle color and depth values of Blinn, and particle radius of Koshiba with the particle alpha blending of Kumar because this modification would provide accurate rendering of composited particles that are alpha blended to efficiently produce the contributing color of merged particles containing a radius, position and depth in 3D space by avoiding occluded portions related to particles at the determined depth in the 3D environment to produce accurate display of the particle in the composited image, thereby reducing the amount of computational resources used to display the contributing colors through avoiding display of the occluded regions.

Regarding claim 19, Cornish teaches a computer-implemented method to produce a particle image to be combined with a second image (abst. lines 3-6: "*…we represent the model as a system of particles, which will be rendered as strokes in the final image and which may optionally overlay a polygonal surface.*", *where rendered stroke particles are combined with the geometric surface image to produce a final composite image*) for animation (abstract lines 7-13:

"*Our primary contribution is…to regulate the number and placement of these particles…and ensuring inter-frame coherence in animated or interactive rendering.*"), the method comprising:

generating a plurality of cutout particles associated with a three-dimensional position of objects in the second image (sec. 1.1 lines 1-13: "*View-dependent particles provide an efficient multiresolution structure for fine-grained control over the placement of strokes, and can be generated from any polygonal model.*" and sec. 2 3rd ¶ lines 3-7: "*…strokes are to be depth-buffered, so that particles on the far side of the object do not generate visible strokes in the final image, the polygons of the object should be rasterized into the depth-buffer.*", *in which the three-dimensional position of cutout particles strokes are determined to ensure visible particles are rendered in a second image on which the particles are to be merged over the corresponding polygon*);

displaying the composited image on a display (abst. lines 3-6: "*…a system of particles, which will be rendered as strokes in the final image and…overlay a polygonal surface.*"). However, Cornish fails to teach for each of a plurality of pixels in the particle image, computing a list of overage layers for the pixel, where each coverage layer in the list of coverage layers includes an accumulated color value due to one or more particles of a particle system and an amount occluded by one or more of the cutout particles, computing a depth map having a plurality of entries for the second image, generating a cutout particle from at least some of the entries in the depth map, each cutout particle having a position and radius in three-dimensional space corresponding to one depth map entry and compositing each cutout particles with other particles of the particle system by alpha blending. Blinn teaches for each of a plurality of pixels in the particle image, computing a list of coverage layers for the pixel (col. 6 line 66 - col. 7 line

3: "*The method for simulating fog described above can be used in complex scenes with several layers of objects and fog...fog enclosing objects in a graphics scene can be modeled with fog layers.*" and in col. 4 lines 30-36: "*…this fog method is applied after computing the color of the pixel being fogged. The fogged pixel can then be composited with another pixel at the same location. This method applies particularly well to a layered graphics rendering pipeline where geometry in a graphics scene is rendered to separate image layers…*"), where each coverage layer in the list of coverage layers includes an accumulated color value due to one or more particles of a particle system and an amount occluded by one or more of the cutout particles (col. 3 lines 10-12: "*The fog is represented as a scattering of dots (e.g., 48) of color F and an amount f(z) corresponding to the fog between the viewpoint and the depth value (z) of the pixel.*" and in col. 10 lines 58-61: "*When placed over the background color F, the proper amount of f shows through to account for the fog color in front of A, i.e. fF, as well as the amount of fog peeking through the fogged A…*", *where several coverage layers are produced for the pixels in the scene, where each image layer includes the contributing color values based on the visibility of the pixels occluded by the particles of fog*);

computing a depth map having a plurality of entries for the second image (col. 20 lines 30-34: "*…depth values for pixel locations in a view space from geometric primitives in the object, for computing the amount of fog...to the fog applier.*", *where depth values for the pixels in the image are calculated*); and

generating a cutout particle from at least some of the entries in the depth map, each cutout particle having a position (col. 1 lines 42-43: "*…the fog...is...calculated as a function of z, the depth of an object…*" and col. 15 lines 35-40: "*…a primitive partially covers a pixel*

location…the tiler computes the pixel…using a z-buffer…", *where the particles have a position in three-dimensional space corresponding to a z value, or depth map entry*, col. 9 lines 5-9: "*…the rendering system can simulate the motion of an object in the z-direction (depth from the viewpoint) by rasterizing the layer that moves in the z-direction independently with new values for the amount of fog…*"), therefore it would have been obvious to one of ordinary skill in the art at the time of invention to modify the particles of Cornish with the coverage layers of Blinn because this modification would enable accurate rendering of particles merged with the surface of a polygonal object through calculating the three-dimensional position of in which to render the visible portions of the particle to reduce visual artifacts in the composite image, however, Cornish and Blinn fail to teach a radius in three-dimensional space corresponding to one depth map entry.

Koshiba teaches a particle having a radius in three-dimensional space (Fig. 4: element "r_I") corresponding to the one depth map entry (col. 13 lines 22-23: "*…p_i…is the three-dimensional space coordinate representing the…position of the…particle…*", *in which the position of the particle corresponds to a depth map entry, or z value*) in 3D space, therefore one skilled in the art at the time of invention would have modified the merged particles of Cornish and particle depth values of Blinn with the corresponding particle radius of Koshiba because this modification would provide correct particle merger over the surface of a geometric object through calculation of the area covered by the particle at a defined depth to ensure visible portions are rendered, and occluded portions are ignored to save computational resources, however, Cornish, Blinn and Koshiba fail to teach compositing each cutout particles with other particles of the particle system by alpha blending.

Kumar teaches alpha blending the particle image with a rendered image of the geometric objects (pg. 4 1st ¶ lines 1-6: "*…alpha blending our particles with the polygons on the surface…*", *in which geometric objects of a rendered image*, Figs. of pgs. 3 & 4, *are merged with particles through alpha blending, therefore cutout particles, as taught by Cornish, would be merged the surface of the geometric objects*), therefore it would have been obvious to one of ordinary skill in the art at the time of invention to modify the composited particles of Cornish, contributing particle color and depth values of Blinn, and particle radius of Koshiba with the particle alpha blending of Kumar because this modification would provide accurate rendering of composited particles and a reduction in computational resources through the determination and display of visible pixels by avoiding occluded portions related to the particles are calculated based on the determined depth and coverage area of the radius of the particle in 3D space for accurate display of the particle in the composited image wherein contributing colors of the composited particles are rendered by using an alpha blending to ensure accurate colors are displayed after merger of the particles with the surface of an object.

Regarding claims 23 and 24, Cornish teaches implemented rendering an image of particles using OpenGL (pg. 4 rgt. col. 1st ¶ lines 5-8: "*Rendering particles directly with OpenGL…*") on an interactive computer system (sec. 4 1st ¶ lines 5-10: "*Rendering particles directly with OpenGL also increases ease of use, enabling the user to experiment with different rendering strategies quickly and painlessly. Incorporating lighting, for example, would be tedious to implement programmatically, but this is easily done in OpenGL.*", *therefore the method of rendering an image is implemented on the computer system using computer program*

stored on a computer readable medium that is executed by the computer system, as commonly known in the art).

Claims 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Cornish in view of Blinn in further view of Koshiba in further view of Kumar and in further view of Curtis ("*Non-Photorealistic Animation*")

Regarding claim 2, Cornish, Blinn, Koshiba and Kumar fail to teach the depth map entries each indicate a distance to a nearest geometric object form a camera position in a particular direction. Curtis teaches the depth map entries each indicate a distance to a nearest geometric object form a camera position in a particular direction (pg. 15 appendix A 1st ¶ lines 1-3: "*…draws the visible silhouette edges of a 3-D model using image processing and a stochastic, physically-based particle system…it requires only a depth map of the model…*", pg. 15 appendix A 1st ¶ lines 1-3 –4th ¶ lines 1-3: "*For input, it requires only a depth map of the model…First, the depth map is converted into two images…Next, particles are generated, one at a time, for a fixed number of particles…*"*and is shown in* Figs. A1 & B1 *in which the darker regions indicate the depth map values which are closer to the viewpoint as compared to the depth values that are shaded lighter to indicate those values are further from the viewpoint*), therefore it would have been obvious to one of ordinary skill in the art at the time of invention to modify the composited particles of Cornish, calculated particle depth values provided by Blinn, particle radius of Koshiba and alpha blending of Kumar with the depth map taught by Curtis because this combination would provide realistic rendering of merged particle images through determination of the depth of each pixel within the image thereby eliminating unnecessary processing burden of

rendering hidden portions of the particle region covered by a certain radius and improving the quality of the image through displaying the visible portion of the composited pixel with alpha blending to provide the contributing color of the merged particles at a given position of the display.

Claims 3 and 20-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cornish in view of Blinn in further view of Koshiba in further view of Kumar in further view of Curtis and in further view of Klassen (US Patent 6,591,020).

Regarding claims 3 and 21, Cornish fails to teach cutout particles are generated at a higher resolution than a particle image. Blinn teaches cutout particles, or fog particles, that correspond to rendered pixels (col. 2 lines 44-46: "*…the fog applicator modifies a pixel…to simulate fog depends on the…model…*"), in which the particles are composited with a geometric surface to produce a particle image, or final image (col. 2 lines 55-57: "*…rendering of the surface of a 3D object into pixel values where the pixel values are modified due to the influence of fog on the object's surface.*"). However, Cornish, Blinn, Koshiba, Kumar and Curtis fail to teach cutout particles are generated at a higher resolution than a particle image. Klassen teaches pixels are generated at a higher resolution than a final image (col. 2 lines 12-19: "*…the edges between the overlapping or abutting objects may appear jagged. Therefore, it is often desirable to antialias these edges…Antialiasing provides the illusion of increased resolution…*", *in which undesired effects, such as aliasing, may be rendered at a higher resolution that the rest of the image to prevent undesired artifacts in the final image, therefore pixels that correspond to the rendered cutout particles of Blinn would be efficiently rendered, through increasing the*

resolution of the particles in the final output image by utilizing the higher resolution rendering teachings presented by Klassen to reduce visual artifacts in the image), therefore it would have been obvious to one of ordinary skill in the art to modify the composited particles of Cornish, calculated particle depth values provided by Blinn, particle radius of Koshiba and alpha blending of Kumar and depth map taught by Curtis with the increased resolution provided by Klassen because this modification would provide smooth realistic images through preventing aliasing artifacts that would decrease the integrity of the image, by enabling certain portions of the image to be generated at a higher resolution.

Regarding claim 20, Cornish, Blinn, Koshiba and Kumar fail to teach portions of the depth map are generated at a higher resolution than a particle image. Curits teaches portions of a depth map generate a particle image (pg. 17 1st ¶ line 1 - 2nd ¶ line 1: "*Render a depth map…for each layer…Apply the…sketchy filter to the depth map…to generate lines …Combine the lines with the dilated matte…composite them together…*", *in which data from the depth is utilized to provide particle lines that cover an object to produce a final image*), however, Cornish, Blinn, Koshiba, Kumar and Curtis fail to teach portion of the depth are generated at a higher resolution than a particle image. Klassen teaches pixels are generated at a higher resolution than a final image (col. 2 lines 12-19: "*…the edges between the overlapping or abutting objects may appear jagged. Therefore, it is often desirable to antialias these edges…Antialiasing provides the illusion of increased resolution…*", *in which undesired effects, such as aliasing, may be rendered at a higher resolution that the rest of the image to prevent undesired artifacts in the final image, therefore pixels that correspond to the depth map provided by Curtis would be efficiently rendered, through increasing the resolution of the particles in the final output image by utilizing*

the higher resolution rendering teachings presented by Klassen to reduce visual artifacts in the image), therefore it would have been obvious to one of ordinary skill in the art to modify the composited particles of Cornish, calculated particle depth values provided by Blinn, particle radius of Koshiba and alpha blending of Kumar and depth map taught by Curtis with the increased resolution provided by Klassen because this modification would provide smooth realistic images through preventing aliasing artifacts that would decrease the integrity of the image by enabling certain portions of the image to be generated at a higher resolution.

Regarding claim 22, Cornish fails to teach generating a plurality of cutout particles comprises sampling geometric objects in the second image at a higher resolution than the particle image at least in areas where aliasing is likely to occur. Blinn teaches performing anti-aliasing techniques for the rendered particles of fog (col. 12 lines 12-18: "*…the stages of the graphics rendering pipeline, including traversing the scene database…antialiasing, shading, fog, and texture mapping…are performed by software modules executing on a computer.*"), however Blinn, Koshiba, Kumar and Curtis fail to teach that the portions of these particles are generated at a higher resolution where aliasing is likely to occur. Klassen teaches portions of an image, including objects represented by z values or portions of the depth map, that present undesired effects, such as aliasing, may be rendered at a higher resolution that the rest of the image (col. 2 lines 12-19: "*…the edges between the overlapping or abutting objects may appear jagged. Therefore, it is often desirable to antialias these edges…Antialiasing provides the illusion of increased resolution…*", *thereby preventing unwanted artifacts in the final image*), therefore it would have been obvious to one of ordinary skill in the art to modify the composited particles of Cornish, calculated particle depth values provided by Blinn, particle radius of Koshiba and alpha

blending of Kumar and depth map taught by Curtis with the higher resolution provided by Klassen because this modification would provide smooth realistic images through preventing aliasing artifacts that would decrease the integrity of the image by enabling certain portions of the image to be generated at a higher resolution.

Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Cornish in view of Blinn in further view of Koshiba in further view of Kumar in further view of Curtis, and in further view of Govindaraju ("*Interactive shadow generation in complex environments*").

Regarding claim 4, Cornish, Blinn, Koshiba, Kumar and Curtis fail to teach cutout particles are generated at a higher resolution at silhouette edges of the depth map. Govindaraju teaches generating pixels at a higher resolution at silhouette edges of the depth map (sec. 2.1 3rd ¶ lines 1-2, 7-9: "*Many techniques have been proposed to handle aliasing of shadow edges…to increase the effective shadow map resolution in areas where edge aliasing occurs.*", *in which pixels of the particles compsoited with geometric objects, as provided by Cornish, would therefor be rendered at a higher resolution at silhouette edges of the depth map to maintain integrity of the image and reduce visual artifacts around the edge of the image*), therefore it would have been obvious to one of ordinary skill in the art at the time of invention to modify the composited particles of Cornish, calculated particle depth values provided by Blinn, particle radius of Koshiba, alpha blending of Kumar and particle depth map of Curtis, with the increased silhouette edge resolution of Govindaraju because this modification would provide a composited image in which the visual depth of the image would be enhanced through the implementation of a depth

map image, thereby resulting in an image free of aliasing artifacts through the higher resolution applied to the edges of the depth map image.

Claims 14 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cornish in view of Blinn in further view of Koshiba in further view of Kumar in further view of Curtis, and in further view of van Wijk ("*Rendering Surface-Particles*").

Regarding claims 14 and 15, Cornish Blinn, Koshiba, Kumar and Curtis fail to teach the computing a depth of field adjustment and a motion blur adjustment for a particle. Van Wijk teaches computing a depth of field adjustment (sec. 4.3 1st ¶ lines 8-11: "*…a more flexible technique would be welcome that allows the user to focus on areas of interest…*" and pg. 60 sec. 4.3 2nd ¶ lines 1-3: "*The effect of depth of field as a tool for the selection of interesting areas is the strongest f put under user control.*"), and a motion blur adjustment (pg. 58 sec. 4.1 right col. 2nd ¶ lines 8-10: "*Motion blurs turns the images of the particles in short lines…*"), for a particle, therefore it would have been obvious to one of ordinary skill in the art at the time of invention to modify the composited particles of Cornish, calculated particle depth values provided by Blinn, particle radius of Koshiba, alpha blending of Kumar and particle depth map of Curtis, with the depth and motion adjustments of van Wijk because this modification would provide a reduction in distorted or undesired rendered particles present in images composed of particles and geometric models through enabling adjustment of distorted areas within the composited particle image.

Response to Arguments

Applicant's arguments with respect to claims 2-4 and 14-24 have been considered but are moot in view of the new ground(s) of rejection.

The 35 U.S.C. 101 rejection of claim 23 has been withdrawn due to the amendment to claim 23.

The applicant argues on pg. 7 2nd ¶ lines 2-3 of the remarks that Koshiba bears no particular relationship to the other references in terms of the technical problem or technical field. However, Koshiba provides teaching of a plurality of particles that comprise a structure or material (col. 1 lines 61-65: "*…the nature of materials, such as clay, in the cybernetic space is simulated using an aggregate (a set) of virtual particles.*") such as clay, mist, paint, etc., which therefore relates Koshiba with other references that also disclose teachings of groups of particles or particle systems.

The applicant argues on pg. 7 3rd ¶ lines 2-3 and pg. 8 1st ¶ lines 5-6 of the remarks that Koshiba does not require the compositing and rendering used in animation, and that there would be no need to render or composite anything in Koshiba. However, Koshiba was not relied upon in the above office action to disclose compositing of particles for animation, therefore in response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.,* 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

The applicant argues on pg. 8 2nd ¶ line 8 of the remarks that the stated reason for combination with Koshiba is inadequate. However, it is clear form the teachings of Koshiba

provide din the above office action that one skilled in the art at the time of invention would have modified the merged particles of Cornish and particle depth values of Blinn with the corresponding particle radius of Koshiba because this modification would provide correct particle merger over the surface of a geometric object through calculation of the area covered by the particle at a defined depth to ensure visible portions are rendered, and occluded portions are ignored to save computational resources.

The applicant argues on pg. 9 1st ¶ lines 3-5 of the remarks that there is no compositing in Cornish, hence Cornish is not particularly pertinent. However, Cornish clearly provides compositing of particles with an object's surface (abst. lines 3-6: "*…we represent the model as a system of particles, which…in the final image…overlay a polygonal surface.*").

The applicant argues on pg. 9 2nd ¶ lines 2-3 of the remarks that in Blinn there is no compositing of the fog with any other objects. However, Blinn provides fog particles that are composited with the surface of an object (col. 2 lines 55-57: "*…rendering of the surface of a 3D object into pixel values where the pixel values are modified due to the influence of fog on the object's surface.*").

The applicant argues on pg. 9 3rd ¶ lines 1-2 and 4th ¶ lines 1-2 of the remarks that there is no adequate reason to combine Conish, Blinn and Koshiba to show the compositing aspect in accordance with the invention. However, it was clearly provided in the office action that it would have been obvious to one of ordinary skill in the art to modify the merged particles of Cornish and particle depth values of Blinn with the corresponding particle radius of Koshiba because this modification would provide correct particle merger over the surface of a geometric object through calculation of the area covered by the particle at a defined depth to ensure visible

portions are rendered, and occluded portions are ignored to save computational resources during merger of particles over the surface of an object.

The applicant argues on pg. 10 1st ¶ lines 1-2 of the remarks that Cornish nor Blinn disclose compositing at all. However, Cornish clearly discloses compositing of particles with a polygon surface (abst. lines 3-6: "*…we represent the model as a system of particles, which…in the final image…overlay a polygonal surface.*"), and Blinn clearly provides teaching of compositing of fog particle the surface of an object (col. 2 lines 55-57: "*…rendering of the surface of a 3D object into pixel values where the pixel values are modified due to the influence of fog on the object's surface.*").

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to SAID BROOME whose telephone number is (571)272-2931. The examiner can normally be reached on M-F 8:30am-5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ulka Chauhan can be reached on (571)272-7782. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Ulka Chauhan/
Supervisory Patent Examiner, Art Unit 2628

/Said Broome/
Examiner, Art Unit 2628